WHAT IS CLAIMED IS:

1.   A system for generating thermal imagery using an MR scanner comprising:

an RF coil;

a tuning means connected to the RF coil;

a pre-amp connected to the tuning means;

a demodulator connected to the output of the pre-amp;

a digitizer connected to the output of the demodulator; and

a computer connected to the output of the digitizer, the computer having a computer

readable medium encoded with a program for collecting noise signals detected by the RF

coil, calculating a variance of the noise signals, and converting the variance to a temperature.

2.   The system of claim 1, further comprising a means for steering a field of view of the
RF coil.

3.   The system of claim 1, further comprising:

a main magnet substantially surrounding the RF coil; and

a gradient magnet substantially surrounding the RF coil.

4.   The system of claim 1, wherein the tuning means comprises:

a network analyzer; and

a non-magnetic variable capacitor.

5.   A method for using an MR scanner to measure absolute temperature of a target

volume, the method comprising the steps of:

tuning an RF coil;

collecting a plurality of signal data from the RF coil;

determining a variance corresponding to the plurality of signal data; and

converting the variance to an absolute temperature data.

6.   The method of claim 5, further comprising the steps of:

storing the absolute temperature data; and

steering a field of view of the RF coil.

7.   The method of claim 5, further comprising the steps of:

retrieving the stored absolute temperature data; and

displaying an image corresponding to the stored temperature data and the field of

view of the RF coil.

8.   The method of claim 5, wherein the step of converting the variance to an absolute

temperature comprises the step of multiplying the variance by a calibration coefficient.

9.   The method of claim 5, further comprising the step of setting a bandwidth, before the

step of collecting a plurality of signal data.

10.   The method of claim 5, further comprising the step of setting a center frequency

before the step of tuning an RF coil.

11.   The method of claim 5, wherein the step of determining a variance corresponding to

the plurality of signal data comprises the step of histogramming the plurality of signal data.

12.   The method of claim 5, further comprising the step of setting a number of samples

corresponding to the plurality of signal data.

13.   The method of claim 5, wherein the step of collecting a plurality of signal data

comprises the step of removing outlier data from the plurality of signal data.

14.   A method for calibrating an MR scanner for measuring absolute temperature of a

target volume, the method comprising the steps of:

        placing a first phantom having a first temperature within a field of view of an RF coil;

        tuning the RF coil;

        collecting a first plurality of signal data from the RF coil;

        determining a first variance corresponding to the first plurality of signal data;

        placing a second phantom having a second temperature within the field of view of the

RF coil;

        collecting a second plurality of signal data from the RF coil;

        determining a second variance corresponding to the second plurality of signal data;

and

        computing a calibration coefficient corresponding to the relation between the first and

second temperature and the first and second variance.

15.   The method of claim 14, further comprising the step of setting a bandwidth before the step of collecting a first plurality of signal data.

16.   The method of claim 16, wherein the calibration coefficient corresponds to the bandwidth.

17.   The method of claim 14, further comprising the step of setting a number of samples corresponding to the plurality of signal data before the step of collecting a first plurality of signal data.

18.   The method of claim 18, wherein the calibration coefficient corresponds to the number of samples.

19.   The method of claim 14, further comprising the step of storing the calibration coefficient after the step of computing the calibration coefficient..

20.   A computer readable medium encoded with a program comprising the steps of:

issuing an instruction to tune an RF coil;

collecting a plurality of signal data from the RF coil;

determining a variance corresponding to the plurality of signal data; and

converting the variance to an absolute temperature data.

27

21.   The computer readable medium of claim 21, wherein the program further comprises

the step of issuing an instruction to steer a field of view of the RF coil, before the step of

collecting a plurality of signal data.

22.   The computer readable medium of claim 22, wherein the program further comprises

the steps of:

    storing the absolute temperature data; and

    storing data corresponding to the field of view of the RF coil.

23.   The computer readable medium of claim 23, wherein the program further comprises

the steps of:

    retrieving the absolute temperature data;

    retrieving the data corresponding to the field of view of the RF coil; and

    constructing an image of the absolute temperature data.+

24.   A method for generating thermal imagery of a tissue, the method comprising the steps

of:

    measuring a magnetic field sensitivity distribution;

    estimating an electric field distribution corresponding to the magnetic field sensitivity

distribution;

    measuring an RF coil impedance;

    estimating an electrical conductivity distribution corresponding to the impedance and

the electrical field distribution; and

estimating a temperature distribution corresponding to the electrical conductivity

distribution and the electric field distribution.